



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/581,468	06/12/2000	MASASHIGE SATO	1111.64360	9963

7590 01/24/2003

Patrick G Burns Esq  
Greer Burns & Crain Ltd  
300 S. WACKER DR., SUITE 2500  
Chicago, IL 60606

EXAMINER

BLOUIN, MARK S

ART UNIT	PAPER NUMBER
----------	--------------

2653

DATE MAILED: 01/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/581,468

Applicant(s)

SATO ET AL.

Examiner

Mark Blouin

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **Detailed Action**

### ***Response to Amendment***

- References filed in an Information Disclosure Statement on June 12, 2000 have been considered and a signed copy of the PTO-1449 is provided.
- Amended Claims 1,5,6,7,17 and cancelled Claim 10 are acknowledged.

### ***Claim Objections***

1. Claims 5 and 6 have been amended to overcome the outstanding objection, subsequently the objection has been withdrawn.

### ***Claim Rejections – 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Noguchi et al. (USPN 5,862,022).

Art Unit: 2653

4. Regarding Claims 1 and 2, Noguchi et al. shows (Fig. 46) a magnetic sensor including a ferromagnetic tunnel junction (21) comprising a free layer (211) a magnetic direction of which freely rotates, a barrier layer formed (210+213) on the free layer and having a smaller thickness in a first region (D1), a region of the free layer corresponding to the first region functioning as a sensor portion for sensing an external magnetic field, wherein the barrier layer is formed by oxidizing the surface of a metal (Col. 10, lines 17-20), and the first region (D1) being a region inside the edge part of the barrier layer (210+213).
5. Regarding Claim 3, Noguchi et al. shows (Fig. 46) a magnetic sensor comprising a fixed layer (212) formed on the barrier layer (210+213), an anti-ferromagnetic layer (216) formed on the fixed layer (212) and fixing a magnetic direction of the fixed layer.
6. Regarding Claim 4, Noguchi et al. shows (Fig. 42) a magnetic sensor wherein the free layer in a region where the fixed layer is not formed is bent away from the fixed layer. The free layer (211) is formed in and occupies its own region below the fixed layer (212) and bends away from the fixed layer at a point in the vicinity above the end of the electrode (22).
7. Regarding Claims 5 and 6, Noguchi et al. shows a magnetic head and magnetic encoder comprising the magnetic sensor (Fig. 23). A magnetic head serves to encode data on recording media and thereby functions as a magnetic encoder.
8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Art Unit: 2653

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

9. Claims 7-9,14, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Gill (USPN 6,108,177).

10. Regarding Claims 7-9,14 and 17, Gill shows (Fig. 9) a hard disk device comprising a magnetic head comprising a ferromagnetic tunnel junction element including a free layer (210) a magnetic direction of which freely rotates, and a fixed layer (206) which is opposed to one surface of the free layer through a barrier layer (208) and a magnetic direction of which is fixed by a anti-ferromagnetic layer (204) which is adjacent thereto, an end portion of the free layer being connected smoothly to a grounded member of high permeability (212) being a shield layer spaced from the ferromagnetic tunnel junction element, neighboring the same, in a region spaced from a signal detection surface.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 7,8,11,12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi et al. in view of Gill.

Art Unit: 2653

13. Regarding Claims 7,8,11,12, and 15, Noguchi et al. shows a magnetic tunnel junction wherein the thickness of the barrier layer near the edge of the fixed layer is larger than a thickness of the barrier layer near a central part of the fixed layer, the free layer is formed wider in a region spaced from the signal detection surface, and the free layer in a region which is not opposed to the fixed layer is bent away from the fixed layer. Noguchi et al. does not show an end portion of the free layer connected to a member of high permeability being a shield layer spaced from the ferromagnetic tunnel junction element in a region space from a signal detection surface. Gill shows (Fig.9) an end portion of the free layer connected to a member of high permeability being a shield layer spaced from the ferromagnetic tunnel junction element in a region space from a signal detection surface. It would have been obvious to one with ordinary skill in the art at the time the invention was made to combine the magnetic tunnel junction of Noguchi et al. with the magnetic head of Gill. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to combine the magnetic tunnel junction of Noguchi et al. with the magnetic head of Gill in which a high magneto-resistive ratio can be achieved with good reproduction characteristics.

15. Claims 13,16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill in view of Fujishima et al. (JPN 07073419A).

16. Regarding Claim 13, Gill shows the features of the magnetic head described above, however, does not show the fixed layer is not exposed to the signal detection surface. Fujishima shows (Fig. 1) the fixed layer is not exposed to the signal detection surface. It would have been obvious to one with ordinary skill in the art at the time the invention was made to move the head of Gill away from the signal detection surface as taught by Fujishima. The rationale is as

Art Unit: 2653

follows: One of ordinary skill in the art at the time of invention would have been motivated to move the head of Gill away from the signal detection surface as taught by Fujishima in order to prevent damage, corrosion, and static electricity from discharging between members.

17. Regarding Claim 16, Gill shows the features of the magnetic head described above, however, does not show a ferromagnetic tunnel junction element further including another fixed layer which is opposed to the free layer, a magnetic direction of another fixed layer being fixed by another anti-ferromagnetic layer which is adjacent thereto. Official Notice is taken that dual ferromagnetic tunnel junction elements are old and well known in the art, therefore, it would have been obvious to one of ordinary skill in the art to combine the aforementioned features with the magnetic head of Gill. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to combine the dual ferromagnetic tunnel junction element with the magnetic head of Gill in order to provide more signal as there is spin dependent scattering on both sides of the free layer.

18. Regarding Claim 18, Gill shows the features of the magnetic head described above, however, does not show a disk array device comprising a plurality of hard disk devices. Official Notice is taken that disk array devices comprising a plurality of hard disk devices are old and well known in the art, therefore, it would have been obvious to one of ordinary skill in the art to combine the aforementioned features with the magnetic head of Gill. The rationale is as follows: One of ordinary skill in the art at the time of invention would have been motivated to combine the disk array device comprising a plurality of hard disk devices with the magnetic head of Gill in order to increase storage capacity.

*Response to Arguments*

19. Applicant's arguments filed on November 21, 2002 have been fully considered but they are not persuasive.

Applicant asserts on Page 4:

"... the first region is a region inside the edge part of the barrier layer" is not disclosed.

The Examiner maintains that whether or not the edge part is part of the first region, the first region is clearly and technically inside (being within) the ferromagnetic tunnel junction of the magnetic head. Therefore, the rejection of Claim 1 and associated dependent claims are upheld.

Applicant asserts on Page 5 :

"... an end portion of a free layer being extended from a ferromagnetic tunnel junction element, and connected to a shield layer of high permeability spaced from the ferromagnetic tunnel junction element ..." is not disclosed.

The Examiner maintains that Gill (USPN 6,108,177) shows a ferromagnetic tunnel junction element including a free layer (210) a magnetic direction of which freely rotates, the free layer being connected smoothly to a grounded member of high permeability (212), in a region spaced from a ferromagnetic tunnel junction element (206). The end portion (Fig.10,ABS) of the free layer (210) extends away from the recording medium while connected to the member of high permeability (Fig.9, (212)) being spaced by a spacer layer (208) from the ferromagnetic tunnel junction element (206).

Therefore, the rejection of Claim 7 and associated dependent claims are upheld.



*Conclusion*

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Blouin whose telephone number is (703) 305-5629. The examiner can normally be reached M-F, 6:00 am – 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful the examiner's supervisor, William Korzuch can be reached at (703) 305-6137. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314 for regular and After Final communications.

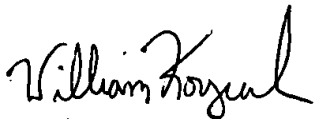
Any inquiry of general nature or relating to the status of application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Application/Control Number: 09/581,468

Page 9

Art Unit: 2653

Mark Blouin  
Patent Examiner  
Art Unit 2653  
July 24, 2002

  
WILLIAM KORZUCH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600